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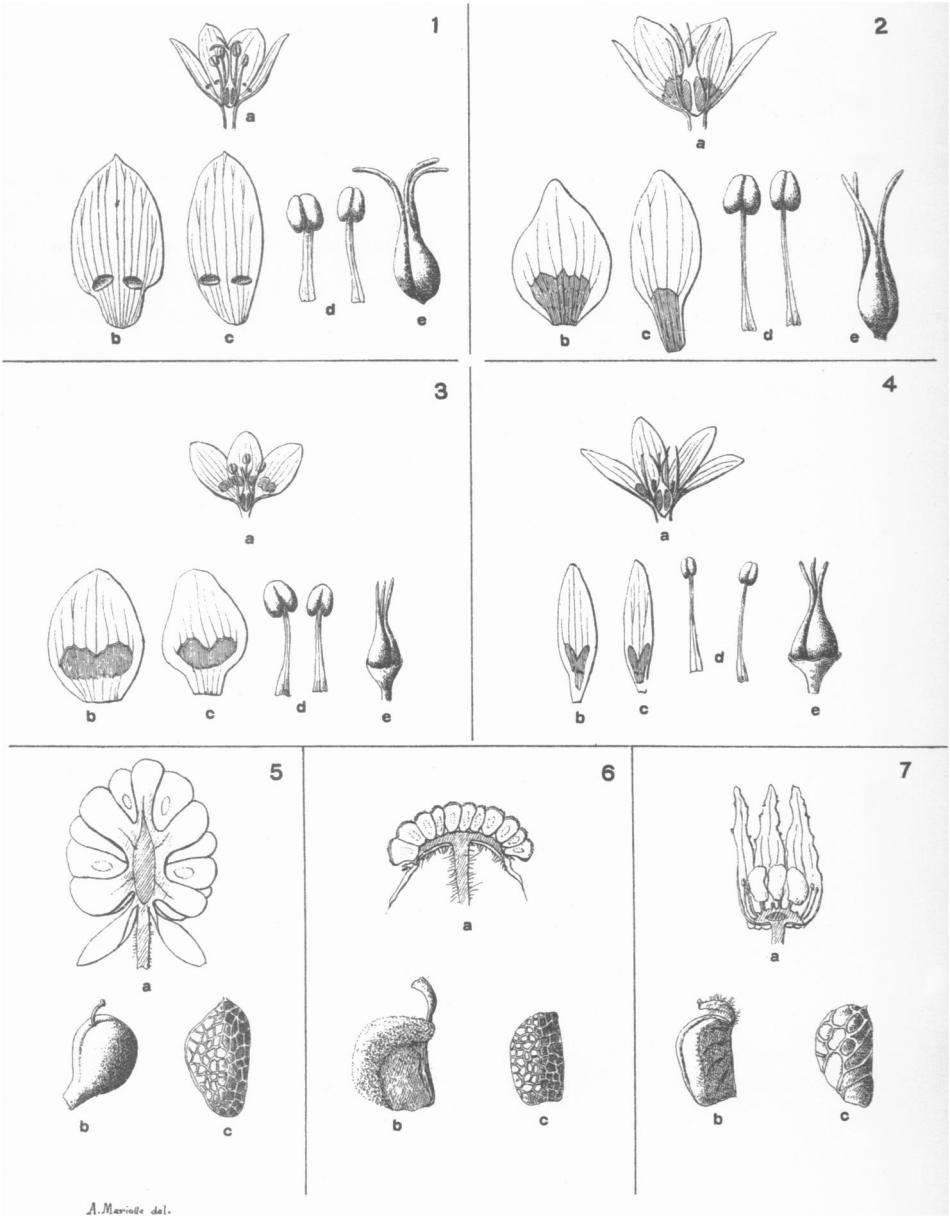
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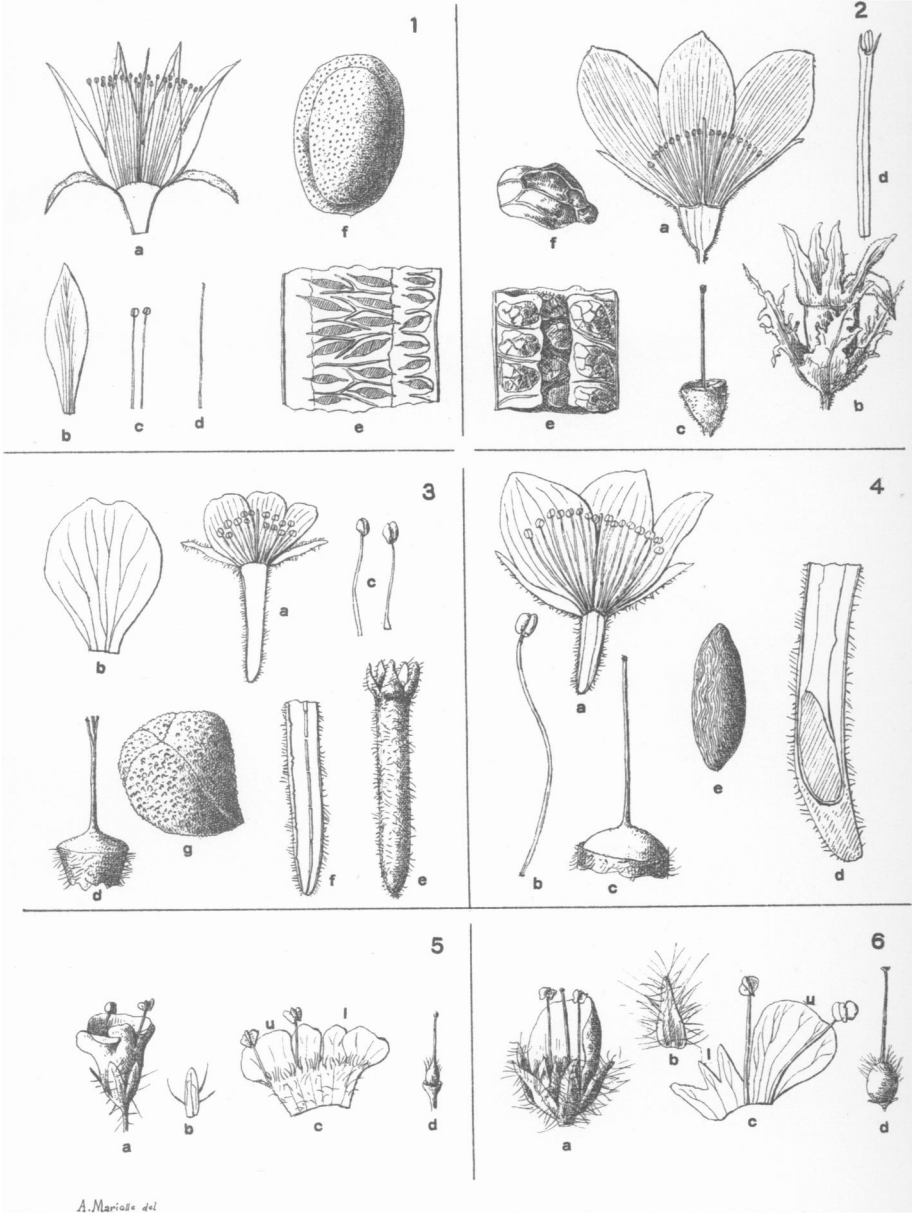
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SEGREGATES OF ZYGADENUS AND RUBUS.



SEGREGATES OF MENTZELIA AND SYNTHYRIS.

BULLETIN
OF THE
TORREY BOTANICAL CLUB

MAY, 1903

Some Generic Segregations

By P. A. RYDBERG

(WITH PLATES 13 AND 14)

The concept of a genus may vary among botanists as well as among zoölogists. To some a genus is an aggregate of all forms of organisms which can be included within a certain artificial description or diagnosis; to others it is a natural group of closely related species or forms and may be modified, extended or limited as soon as these forms become better known. It is unnecessary to state that the former view nowadays has very few advocates, for nature was never made to follow the narrow concepts of man. A systematist who holds the second view, tries first to find what species are closely related, and when these are brought together, he tries to draw a diagnosis of the genus. The limitation of a genus depends naturally upon the personal views of the taxonomist. What is a single genus to one botanist may to another constitute half a dozen or more good genera, *i. e.*, groups of related species. It matters little how broad or narrow concepts we have of a genus, if only we are consistent and in the same family or tribe designate as genera equivalent natural groups of related species; *i. e.*, not making in one case the limits of a genus too large and in another too narrow.

I. An inconsistency of this kind exists, I think, in the usual treatments of the family Melanthaceae. *Chrosperma* and *Stenanthium*, *Melanthium* and *Veratrum*, are separated by rather trifling characters, while in *Zygadenus* are included species of no closer relationship. If we keep as distinct all of the first four genera,

[The preceding number of the BULLETIN, Vol. 30, No. 4, for April, 1903 (30 : 197-270, *pl.* 11, 12), was issued 24 Ap 1903.]

we must, if consistent, divide *Zygadenus* into at least three genera. Briefly these may be distinguished as follows :

Plant with a rootstock ; each petal and sepal with two glands.	<i>Zygadenus</i> .
Plant with a bulb ; each petal and sepal with a single gland.	
Ovary wholly superior ; gland obovate or semi-orbicular.	<i>Toxicoscordion</i> .
Ovary partly inferior ; gland obcordate.	<i>Anticlea</i> .

ZYGADENUS Michx. Fl. Bor. Am. 1: 213. 1803

This genus was established on a single species *Z. glaberrimus* and the generic name will go with it. This species differs from all that later have been included in the genus, in having a thick elongated rootstock instead of a bulb and two distinct round glands on each of the petals and sepals. As far as I know the genus consists of only one species.

Toxicoscordion gen. nov.

Glabrous, more or less poisonous perennials with narrow linear conduplicate leaves, yellowish racemose or paniculate flowers and membrane-coated bulbs. Flowers perfect (in one species described as polygamous, but as far as I know erroneously so). Petals and sepals bearing a single obovate or semiorbicular gland at or above the base of the blade, in most species more or less clawed. Ovary wholly superior. Stamens (except in one species) more or less adnate to the base of the petals and sepals ; anthers subreniform, confluent one-celled. Capsule 3-celled, 3-beaked, septicidal. Seeds numerous.

The first species known belonging to this group was published under the name *Amianthium Nuttallii* A. Gray ; but as this is somewhat aberrant from the general type of the genus, I have selected one of the most common species, *Zygadenus intermedius*, as the type. The following species belong here :

1. **T. intermedium** ; *Z. intermedius* Rydb.*
2. **T. venenosum** (S. Wats.) ; *Z. venenosus* S. Wats.
3. **T. gramineum** ; *Z. gramineus* Rydb.
4. **T. acutum** ; *Z. acutus* Rydb.
5. **T. falcatum** ; *Z. falcatus* Rydb.
6. **T. paniculatum** (Nutt.) ; *Helonias paniculata* Nutt.
7. **T. Nuttallii** (A. Gray) ; *Amianthium Nuttallii* A. Gray.

* For citations and synonyms, see Bull. Torrey Club, 27: 534-538. 1900.

8. **T. Fremontii** (Torr.); *Anticlea Fremontii* Torr. Pac. R. R. Rep. 4: 144. 1856; *Zygadenus Fremontii* Torr.; S. Wats. King's Exped. 5: 343. 1871.

ANTICLEA Kunth.

This genus was established on *A. Sibirica* and *A. glauca* with *A. Mexicana* added as a doubtful species. *A. Sibirica*, the first one mentioned, must be regarded as the type. It differs somewhat from our American species, especially in the narrow somewhat recurved petals and sepals and the narrow glands, but these differences are rather unimportant and do not warrant any generic separation. The genus is characterized by a membranous coated bulb, linear glabrous leaves, greenish or yellowish-white flowers, withering persistent petals and sepals, which are adnate to the base of the ovary and bear a single obcordate gland; free stamens and a partly inferior ovary. The species are:

1. **A. SIBIRICA** (L.) Kunth, Enum. 4: 191. 1843; *Melanthium Sibiricum* L. Sp. Pl. 339. 1753; *Zygadenus Sibiricus* Kunth, Enum. 4: 192, as synonym.
2. **A. chlorantha** (Richards.) ; *Z. chloranthus* Richardson, Frankl. Journ. 736. 1821; *Z. commutatus* Schultes, Syst. 7: 1560. 1830; *Z. glaucus* Nutt. Jour. Acad. Phila. II. 7: 56. 1834; *Anticlea glauca* Kunth, Enum. 4: 192. 1843.
3. **A. virescens** (H.B.K.) ; *Helonias virescens* H.B.K. Nov. Gen. & Sp. 1: 267. 1816; *A. Mexicana* Kunth, Enum. 4: 193. 1843; *Z. Mexicanus* Hemsl. Biol. Cent. Am. 3: 382. 1885.
4. **A. elegans** (Pursh); *Z. elegans* Pursh, Fl. Am. Sept. 241. 1814.
5. **A. Coloradensis** ; *Z. Coloradensis* Rydb. Bull. Torrey Club, 27: 534. 1900.
6. **A. porrifolia** (Greene); *Z. porrifolius* Greene, Bull. Torrey Club, 8: 123. 1881.

II. Another segregation needed, I have found in the genus *Rubus*. If *Dalibarda* is to be held distinct from that genus and *Duchesnea* from *Fragaria*, etc., certain species have to be removed from *Rubus* as now understood, as both in general habit and the

structure of the fruit they are so unlike the rest of the species. The segregated genera would be distinguished as follows :

Styles club-shaped ; stigmas slightly 2-lobed ; receptacle flat ; shrubs, unarmed, with shreddy bark and digitately ribbed maple-like leaves.

Drupelets capped by hard hairy cushions ; styles glabrous ; erect shrubs. *Rubacer*.

Drupelets without cushions ; styles hairy ; prostrate or reclining vines. *Oreobatus*.
 Styles filiform, glabrous ; stigmas usually capitate ; receptacle hemispherical, conical or nipple-shaped ; drupelets without cushions ; leaves in most species pinnate and stem in most prickly. *Rubus*.

Rubacer gen. nov.

Unarmed shrubs with more or less shreddy bark, more or less glandular above. Leaves petioled, simple, digitately ribbed and lobed, with acute or acuminate lobes and cordate bases, resembling the leaves of certain maples. Flowers showy, in small panicles : sepals ovate with long slender acuminations : petals pink or white, oval or rounded : pistils numerous : receptacle flat or nearly so : drupelets numerous, capped with a dry, rather hard, finely and densely pubescent cushion with the club-shaped style attached under the margin.

The type is the first species cited below.

1. **Rubacer odoratum** (L.) ; *Rubus odoratus* L. Sp. Pl. 494. 1753.
2. **Rubacer parviflorum** (Nutt.) ; *Rubus parviflorus* Nutt. Genera 1: 308. 1818 ; *Rubus Nutkanus* Moc. ; Seringe, DC. Prodr. 2: 566. 1825.
3. **Rubacer tomentosum** ; *Rubus velutinus* Hook. & Arn. Bot. Beechey Voy. 140. 1841 ; Not Vest. 1823.
4. **Rubacer Columbianum** (Millsp.) ; *Rubus odoratus* var. *Columbianus* Millsp. Bull. W. Va. Agr. Exp. Sta. 2: 355. 1892.

Oreobatus gen. nov.

Prostrate or reclining shrubby vines with light colored, shreddy bark. Leaves petioled, simple, maple- or gooseberry-like, digitately ribbed and lobed with rounded serrate lobes. Flowers showy, usually solitary : sepals ovate or ovate-lanceolate, acuminate or the tips foliaceous, in fruit erect : petals white, 1.5–3 cm. long, broadly obovate : stamens very numerous, hiding the fewer pistils : receptacle flat or nearly so : styles club-shaped, curved ; stigma somewhat 2-lobed ; young fruit apparently very pubescent, owing to the hairy styles : drupelets not very fleshy, without hairy cushions.

The first of the following two species is regarded as the type :

1. **O. deliciosus** (James); *Rubus deliciosus* James; Torr. Ann. Lyc. N. Y. 2: 196. 1828.
2. **O. Neo-Mexicanus** (A. Gray); *Rubus Neo-Mexicanus* A. Gray, Pl. Wright. 2: 55. 1853.

III. A similar inconsistency we find in the Loasaceae, where the genus *Mentzelia* as it is represented in United States is composed of at least four distinct groups deserving generic rank* with just as good right as several other recognized genera in the family.

The principal distinguishing characters are:

Placentae with horizontal lamellae between the seeds; these in 2 rows.

Filaments 3-cleft at the apex, the middle tooth bearing the anthers, the lateral teeth cuspidate; seeds angled or with folds, not winged; annuals.

Bicuspidaria.

Filaments not cleft; seeds very flat, more or less winged; perennials.

Touleria.

Placentae without lamellae; seeds usually prismatic.

Placentae slender, filiform; ovules in one row, 10-40; seeds minutely muricate, not striate; filaments free or nearly so.

Acrolasia.

Placentae broad, band-like; ovules in 1-2 rows, few; seeds distinctly striate, often rugose; filaments at the base united with the petals into a ring.

Mentzelia.

Bicuspidaria (S. Wats.) gen. nov.

Mentzelia § *Bicuspidaria* S. Wats. Proc. Am. Acad. 20: 367. 1885.

Annuals with rather large flowers. Petals 5, free; stamens 80-130, dilated, 3-cleft at the apex, the middle tooth bearing the anthers; placentae with a vertical wing and horizontal lamellae between the ovules and seeds; these 15-40 in 2 rows on each placenta; capsule cylindric, inflated, sessile, thin-walled; seeds irregular, angled or with folds, not winged.

The first of the following species is taken as the type.

1. **B. tricuspis** (A. Gray); *Mentzelia tricuspis* A. Gray, Am. Nat. 9: 271. 1875.
2. **B. involucrata** (S. Wats.); *Mentzelia involucrata* S. Wats. Proc. Am. Acad. 20: 367. 1885.
3. **B. hirsutissima** (S. Wats.); *Mentzelia hirsutissima* S. Wats. Proc. Am. Acad. 12: 252. 1877.

* It may be that the other three sections of Urban and Gilg, viz., *Micromentzelia*, *Octopetaleia* and *Dendromentzelia* should also be treated as genera; but better knowledge is needed.

TOUTEREA Eaton & Wright, N. Am. Bot. 454. 1840

Bartonia Sims, Bot. Mag. *pl.* 1487. 1804. Not Muhl. 1801.

Torreyia Eat. Man. Ed. 7. 560. 1836. Not Raf. 1818.

Hesperaster Cockerell, *Torreyia*, 1: 142. 1901.

This genus contains nearly all the large-flowered species included in *Mentzelia*. The outer filaments are more or less dilated; in most they are without anthers and in some as large as and resembling the petals. These species are often described as having ten petals. The genus *Touteria* was based on the first two species mentioned below; *Bartonia* Sims on *Bartonia decapetala* and the type of *Hesperaster* is the same. As far as I know, the following species belong here:

1. **T. decapetala** (Pursh); *Bartonia decapetala* Pursh, Bot. Mag. *pl.* 1487. 1812; *B. ornata* Pursh, Fl. Am. Sept. 327. 1814; *Touteria ornata* Eat. & Wright, N. Am. Bot. 454. 1840; *M. ornata* Torr. & Gray, Fl. N. Am. 1: 534. 1840.
2. **T. NUDA** (Pursh) Eat. & Wright, N. Am. Bot. 454. 1840; *Bartonia nuda* Pursh, Fl. Am. Sept. 328. 1814; *M. nuda* Torr. & Gray, l. c.
3. **T. laevicaulis** (Dougl.); *Bartonia laevicaulis* Dougl.; Hook. Fl. Bor. Am. 1: 221. 1833; *M. laevicaulis* Torr. & Gray, Fl. N. Am. 1: 535. 1840.
4. **T. Brandegei** (S. Wats.); *M. Brandegei* S. Wats. Proc. Am. Acad. 20: 367. 1885.
5. **T. parviflora** (Dougl.); *B. parviflora* Dougl.; Hook. Fl. Bor. Am. 1: 221. 1833.
6. **T. pterosperma** (Eastw.); *M. pterosperma* Eastw. Proc. Cal. Acad. II. 6: 290. 1896.
7. **T. stricta** Osterhout Mss.; *Hesperaster strictus* Osterhout, Bull. Torrey Club, 29: 174. 1902.
8. **T. Rusbyi** (Wooton); *Mentzelia Rusbyi* Wooton, Bull. Torrey Club, 25: 261. 1898.
9. **T. Wrightii** (A. Gray); *M. Wrightii* A. Gray, Pl. Fendl. 48. 1848.
10. **T. speciosa** Osterhout Mss.; *M. speciosa* Osterh. Bull. Torrey Club, 28: 689. 1901; *M. aurea* Osterh. Bull. Torrey Club, 28: 644. 1901. Not Nutt. 1818.

11. **T. densa** (Greene); *M. densa* Greene, Pittonia, **3**: 99. 1896.
12. **T. pumila** (Nutt.); *M. pumila* Nutt.; Torr. & Gray, Fl. N. Am. **1**: 535. 1840.
13. **T. chrysantha** (Engelm.); *M. chrysantha* Engelm.; Brand. Bull. U. S. Geol. Surv. Terr. **2**: 237. 1876; *M. lutea* Greene, Pittonia, **3**: 99. 1896.
14. **T. humilis** (A. Gray); *M. multiflora* var. *humilis* A. Gray, Pl. Wright. **1**: 74. 1852.
15. **T. multiflora** (Nutt.); *Bartonia multiflora* Nutt. Jour. Acad. Phila. II. **1**: 180. 1847.
16. **T. perennis** (Wooton); *M. perennis* Wooton, Bull. Torrey Club, **25**: 260. 1898.
17. **T. MULTICAULIS** Osterhout, Bull. Torrey Club, **30**: 236. 1903.

ACROLASIA Presl. Rel. Haenk. **2**: 39. 1831

Trachyphytum Nutt.; Torr. & Gray, Fl. N. Am. **1**: 533. 1840.

This genus was established on a Chilean species, *A. bartonioides* Presl, which has fewer ovules (12) and fewer stamens than its North American allies, but the structure of the ovary and seeds is the same. All the species are annuals and characterized by the long cylindric capsules, the filiform placentae and the muricate more or less prismatic seeds. Most of the species are small-flowered, with linear, lanceolate or ovate-oblong, laciniate, dentate or more rarely entire sessile leaves. The following North American species belong here :

1. **A. congesta** (Nutt.); *M. congesta* Nutt.; Torr. & Gray, Fl. N. Am. **1**: 534. 1840; *Trachyphytum congestum* Nutt.; Torr. & Gray, l. c.
2. **A. ctenophora**; *M. ctenophora* Rydb. Bull. Torrey Club, **28**: 33. 1901.
3. **A. Tweedyi**; *M. Tweedyi* Rydb. Mem. N. Y. Bot. Gard. **1**: 271. 1900.
4. **A. albicaulis** (Dougl.); *M. albicaulis* Dougl.; Hook. Fl. Bor. Am. **1**: 222. 1833; *Bartonia albicaulis* Hook. l. c.
5. **A. tenerrima**; *M. tenerrima* Rydb. Mem. N. Y. Bot. Gard. **1**: 271. 1900.

6. **A. integrifolia** (Wats.); *M. albicaulis* var. *integrifolia* S. Wats. King's Exp. 5 : 114. 1871; *M. dispersa* S. Wats. Proc. Am. Acad. 11 : 115. 1876.
7. **A. compacta** (A. Nelson); *M. compacta* A. Nels. Bull. Torrey Club, 25 : 275. 1898.
8. **A. gracilentia** (Torr. & Gray); *M. gracilentia* Torr. & Gray, Fl. N. Am. 1 : 534. 1840.
9. **A. affinis** (Greene); *M. affinis* Greene, Pittonia, 2 : 103. 1890.
10. **A. aurea** (Lindl.); *Bartonia aurea* Lindl. Bot. Reg. 22 : pl. 1831. 1836. Not *Mentzelia aurea* Nutt. 1818; *M. Lindleyi* Torr. & Gray, Fl. N. Am. 1 : 533. 1840.
11. **A. nitens** (Greene); *M. nitens* Greene, Fl. Francisc. 234. 1891.
12. **A. Veatchiana** (Kellogg); *M. Veatchiana* Kellogg, Proc. Cal. Acad. 2 : 99. 1863.
13. **A. pectinata** (Kellogg); *M. pectinata* Kellogg, Proc. Cal. Acad. 3 : 40. 1868.
14. **A. micrantha** (Torr. & Gray); *M. micrantha* Torr. & Gray, Fl. N. Am. 1 : 535. 1840.

IV. A fourth segregation is proposed in *Synthyris*. Professor Greene has included this genus in *Wulfenia* and he has been followed by many American botanists. *Wulfenia*, represented by European and Asiatic plants, has a 4-valved capsule, which is neither flattened nor emarginate at the apex, and a corolla with a long tube. All the American species have flattened capsules, which are 2-valved and obcordate at the apex. In this respect they agree perfectly with *Veronica*. The original *Synthyris* (*S. reniformis*) and a few related species have a corolla that is built exactly on the same plan as that of *Veronica*, and it is only the general habit that keeps them out of that genus. *S. alpina* and its relatives, on the contrary, have an altogether different corolla, cleft to near the base into two distinct lips. *S. rubra* and its allies have no corollas but agree otherwise both in general appearance and structure of the flower and fruit with *S. alpina*. It would however hardly be advisable to place them in different genera merely on account of the presence or absence of the corolla. The related genera are distinguished as follows :

Corolla scarcely 2-lipped ; almost equally deeply 4-lobed.

Corolla tubular-funnelform ; capsule neither flattened nor obcordate at the apex, 4-valved.

Leaves alternate but mostly basal.

Wulfenia.

Leaves opposite ; stem leafy.

Leptandra.

Corolla rotate or short-campanulate ; capsule flattened, obcordate, 2-valved.

Leaves opposite or whorled ; stem leafy.

Veronica.

Leaves alternate, but mostly basal ; plant with a mostly naked scape.

Synthyris.

Corolla, if present, deeply 2-lipped ; upper lip entire, broad, arcuate ; lower lip straight and deeply laciniate ; leaves alternate but mostly basal ; scape bracted.

Besseyia.

SYNTHYRIS Benth. ; DC. Prodr. 10 : 454. 1846

This genus was based on *S. reniformis*. *S. rubra* was also included in the genus by the author, but he admits that it is a rather anomalous member, lacking the corolla. It is, however, more nearly related to *S. alpina*, which has a corolla of a different structure. The species belonging here are the following : *S. reniformis* (Dougl.) Benth., *S. major* (Hook.) Heller, *S. pinnatifida* S. Wats. and *S. laciniata* (Gray) Rydb. Whether *S. rotundifolia* A. Gray should also be included or should be made the type of a separate genus is a little doubtful. At present I am inclined to regard it as a *Synthyris*. So also *S. schizantha* Piper, with lacerate corolla-lobes, which species is still more aberrant.

Besseyia gen. nov.

Low perennials with a thick rootstock. Basal leaves petioled ; blades ovate or oblong, crenate ; stem-leaves bract-like, alternate : inflorescence a bracted spike : calyx almost regularly 4-cleft to near the base or cleft to the base on the upper side and then 2-3-lobed : corolla 2-lipped, cleft to near the base, or lacking ; upper lip, if present, entire, obovate or cuneate-obovate, concave ; lower lip much shorter, often irregularly 2-3-cleft or laciniate : stamens 2, attached at the base of the corolla, or if this is absent on a small disk : capsule flattened, obcordate, 2-valved.

It is with pleasure that I dedicate this genus of western mountain plants to Professor Charles E. Bessey, of the University of Nebraska, my former teacher and the most prominent botanist of the region where these small plants grow.

The first species cited below is regarded as the type.

a. With corolla :

1. **B. alpina** (A. Gray); *Synthyris alpina* A. Gray, Am. Jour. Sci. II. **34**: 251. 1862.
2. **B. Bullii** (Eaton); *Gymnandra Bullii* Eat.; Eat. & Wr. N. Am. Bot. 259. 1840; *Synthyris Houghtoniana* Benth.; DC. Prodr. **10**: 454. 1846.
3. **B. plantaginea** (Benth.); *S. plantaginea* Benth.; DC. Prodr. **10**: 455. 1846.
4. **B. reflexa** (Eastw.); *S. reflexa* Eastw. Proc. Cal. Acad. III. **1**: 124. 1898.
5. **B. Ritteriana** (Eastw.); *S. Ritteriana* Eastw. l. c. 123.

b. Without corolla :

6. **B. rubra** (Dougl.); *Gymnandra rubra* Dougl.; Hook. Fl. Bor. Am. **2**: 103. 1838; *Synthyris rubra* Benth.; DC. Prodr. **10**: 455. 1846.
7. **B. gymnocarpa** (A. Nels.); *Wulfenia gymnocarpa* A. Nelson, Bull. Torrey Club, **25**: 282. 1898.
8. **B. Wyomingensis** (A. Nels.); *W. Wyomingensis* A. Nelson, l. c. 281.

NEW YORK BOTANICAL GARDEN.

Explanation of Plates

PLATE 13

FIG. 1. *Zygadenus glaberrimus* Michx. a, section of flower; b, sepal; c, petal; d, stamens; e, pistils.

FIG. 2. *Toxicoscordion intermedium* Rydb. a, b, etc., as above.

FIG. 3. *Anticlea elegans* (Pursh) Rydb. a, b, etc., as above.

FIG. 4. *Anticlea Sibirica* (L.) Kunth. a, b, etc., as above.

FIG. 5. *Rubus nigrobaccus* Bailey. a, section of receptacle; b, a young drupelet; c, stone.

FIG. 6. *Rubacer odoratum* (L.) Rydb. a, b, c, as in the preceding.

FIG. 7. *Oreobatus deliciosus* (James) Rydb. a, b, c, as in the preceding.

PLATE 14

FIG. 1. *Touterea decapetala* (Pursh) Rydb. a, section of the flower showing two of the petals and two of the similar staminodia; b, one of the petals; c, stamens; d, style; e, partial section of the capsule showing one placenta in front view and half of another in lateral view; f, winged seed.

FIG. 2. *Bicuspidaria tricuspis* (A. Gray) Rydb. a, section of flower; b, fruit; c, pistil; d, stamen with the two cusps; e, section of a part of the capsule, showing in

lateral view one half of two placentae with seeds, between them the horizontal lamellae and behind the vertical wings ; between the latter are seen seeds on the third placenta ; f, a seed.

FIG. 3. *Acrolasia albicaulis* (Dougl.) Rydb. a, section of flower ; b, petal ; c, stamens ; d, pistil ; e, capsule ; f, longitudinal section of the same showing the narrow filiform placenta with seeds removed ; g, a muricate prismatic seed.

FIG. 4. *Mentzelia oligosperma* Nutt. a, section of flower ; b, stamen ; c, pistil ; d, section of a part of the capsule, showing the broad placenta with the seeds removed, except one ; e, a striate seed.

FIG. 5. *Synthyris reniformis* (Dougl.) Benth. a, a flower ; b, sepal ; c, corolla laid open ; u, upper lip ; l, lower lip ; d, pistil.

FIG. 6. *Besseyia alpina* (A. Gray) Rydb. a, b, etc., as in the preceding.